

WHAT IS CLAIMED IS:

1. A trackball for inputting operation information to electronic devices, comprising:

5 a ball portion magnetically coupleable in directions of a first axis and a second axis, the first and second axes intersecting with each other at the center of the ball portion and orthogonal to each other;

a case portion for enclosing the ball portion such that
10 an upper portion of the ball portion is exposed;

a first magnet portion for stabilizing the ball portion at predetermined rotation angles by magnetically coupling to the ball portion in one of the axial directions; and

a second magnet portion for attracting the ball portion
15 in a direction orthogonal to a rotation axis of the ball portion, by magnetically coupling to the ball portion in the other one of the axial directions.

2. The trackball according to claim 1, wherein:

20 the ball portion is magnetically coupleable in a direction of a third axis intersecting with the first and second axes at the center of the ball portion and orthogonal to the first and second axes; and

the first magnet portion allows each of any two axes
25 among the first to third axes which are present on the same plane

to serve as a rotation axis of the ball portion.

3. The trackball according to claim 2, wherein the ball portion comprises first to third bar members arranged on the first to third axes respectively and made of an unmagnetized magnetic material, wherein:

the first magnet portion comprises:

a first fixed magnet portion made up of a pair of magnets for forming a first rotation axis by magnetically coupling to the first bar member, the magnets being respectively fixed to side-surfaces of the case portion; and

a second fixed magnet portion made up of a pair of magnets for forming a second rotation axis by magnetically coupling to the second bar member, the magnets being respectively fixed to side-surfaces of the case portion; and

the second magnet portion comprises a third fixed magnet portion for attracting the third bar member by magnetically coupling to the third bar member, the third fixed magnet portion being fixed to a bottom-surface of the case portion.

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4. The trackball according to claim 3, wherein the ball portion further comprises an even number of bar members arranged on an even number of axes respectively and made of an unmagnetized magnetic material, the even number of axes intersecting at an intersection point of any two axes among the first to third axes

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which are present on the same plane, and at equal angles.

5. The trackball according to claim 3, wherein the case portion is made of an unmagnetized magnetic material.

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6. The trackball according to claim 2, further comprising a third magnet portion arranged at a location that makes a predetermined angle from any one of rotation axes formed by the first magnet portion, and stabilizing the ball portion by magnetic coupling when the ball portion rotates around the any one of rotation axes.

7. The trackball according to claim 6, further comprises means for switching between a presence and absence of a magnetic force of the third magnet portion.

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8. The trackball according to claim 7, wherein the magnetic force switching means performs the switching in accordance with control parameters of the electronic devices.

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9. The trackball according to claim 1, wherein the magnetic force of the second magnet portion is greater than that of the first magnet portion.

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10. The trackball according to claim 9, wherein the

magnetic force of the second magnet portion is twice that of the first magnet portion.

11. The trackball according to claim 1, wherein:

5 the ball portion is magnetically coupleable in directions of a plurality of axes on a plane made up of the first and second axes, the plurality of axes intersecting at an intersection point of the first and second axes; and

the case portion exposes the upper portion of the ball
10 portion so as to restrict a rotation angle of the ball portion.

12. The trackball according to claim 11, wherein:

the plurality of axes are in an even number;

the ball portion comprises:

15 first and second bar members arranged on the first and second axes respectively and made of an unmagnetized magnetic material; and

an even number of bar members arranged on the plurality of axes respectively and made of an unmagnetized magnetic material;

20 the first bar member, the second bar member, and the plurality of bar members are arranged with an equal angle therebetween; and

the case portion exposes the upper portion of the ball portion such that the ball portion rotates at an angle corresponding
25 to an angle between the bar members.

13. An in-vehicle device controller comprising a trackball for inputting operation information to electronic devices mounted on a vehicle, wherein

5 the trackball comprises:

a ball portion magnetically coupleable in directions of a first axis and a second axis, the first and second axes intersecting with each other at the center of the ball portion and orthogonal to each other;

10 a case portion for enclosing the ball portion such that an upper portion of the ball portion is exposed;

a first magnet portion for stabilizing the ball portion at predetermined rotation angles by magnetically coupling to the ball portion in one of the axial directions; and

15 a second magnet portion for attracting the ball portion in a direction orthogonal to a rotation axis of the ball portion, by magnetically coupling to the ball portion in the other one of the axial directions.

20 14. The in-vehicle device controller according to claim 13, wherein the trackball is mounted on a steering-wheel portion of the vehicle.